## THE GREATER INCREASE IN SIZE AND INTENSITY OF THE EXTRATROPICAL CYCLONE BY NIGHT THAN BY DAY

W. J. HUMPHREYS

Mr. C. L. Mitchell, of the United States Weather Bureau, has called my attention to the interesting fact that winter cyclones moving northeastward in the United States, and doubtless similar storms also in other parts of the world, increase in size and intensity more rapidly by night than by day. Perhaps this phenomenon and its explanation are well known, but even so a repetition, if it be a repetition, of its brief explanation may be in order, for surely it is not very widely known.

In general, as everyone knows, the cool section of a cyclonic area is relatively clear and the warm section cloudy. At night, therefore, the clear section gets colder, or at least colder than it otherwise would be, owing to the great net loss of heat from the surface by radiation, while the clouded side more nearly maintains its temperature. During the daytime, on the other hand, the clear side warms up by insolation while the clouded portion again changes in temperature but little. That is, during the night the temperature contrast between the warm and the cool portions of the cyclone becomes or tends to become more and more pronounced and during the day less and less so. Furthermore, there is greater interference to the flow of the colder air during the daytime, owing to the thermal convection caused by insolation, than at night when there is no such convection. Hence, owing to the greater temperature contrast at night than during the day, and less obstruction to wind movement the cyclone normally grows, or tends to grow, more rapidly at night than during the day.

## NOVEMBER FLOODS IN NEW ENGLAND AND EASTERN NEW YORK

By H. C. FRANKENFIELD

*The New England and eastern New York floods.*—On the morning of November 3, 1927, pressure was quite low over Virginia and the Carolinas, while an increasing high pressure area was off the southeast coast of Newfoundland. Twelve hours later the center of the storm was just off the coast of New Jersey, with sea-level pressure of 29.32 inches, while the high pressure area to the northeastward had also increased in magnitude. It happened that the pressure development and distribution during the night of November 2 had been ideal for the occurrence of heavy precipitation. This, however, did not become apparent until the morning of November 3, and by the evening of that date torrential rains had fallen over eastern New York and western New England.

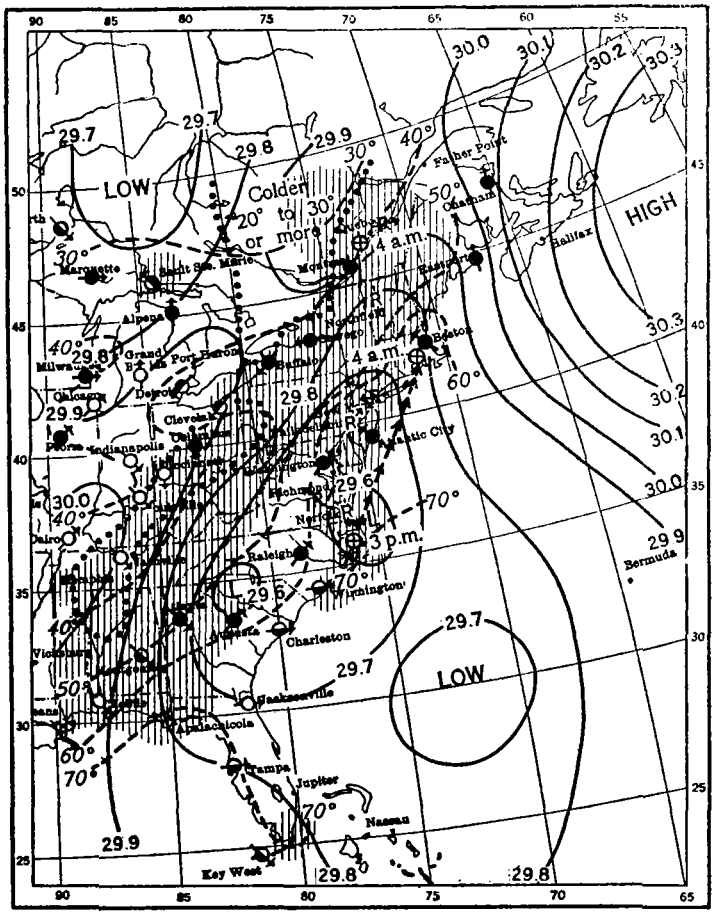


FIG. 1.—Weather conditions east of the Mississippi at 8 a. m. (eastern standard time) Two storm centers are shown on the 4th

The pressure distribution at 8 a. m., seventy-fifth meridian time on November 3, is shown in Figure 1. At that time a great barometric depression was centered over the Carolinas with local centers of relatively low pressure over the adjacent waters of the Atlantic and also north of the lower Lakes. By the next morning these several centers had consolidated, a northeastward movement had taken place with the result that there was now a single large depression of the barometer that stretched from the vicinity of Montreal to the Atlantic off the southern New England coast. Coincidently with this consolidation and movement, pressure in the oceanic HIGH off Newfoundland had risen to 30.50 inches, thus creating a pressure difference between St. Johns and Boston of 1.4 inches. In other words, an exceptionally strong pressure gradient for southeast to east surface winds over New England and the Hudson River Valley was formed. According to the well-known law of the turning of the wind with altitude southeast surface winds would turn to south winds, say from 1,500 to 3,000 meters; above that level they would have a large westerly component. These winds from off the sea were high in moisture content and heavy rains naturally resulted. Their long continuance was due to the fact that the relative position of the two barometric formations just described did not change materially for at least 36 hours.

The distribution of the precipitation for the period November 2–4 is graphically shown in Figure 2.

After the heavy rains of the day and night of November 3, a great flood was inevitable. So heavy was the rain, in fact, that the floods attained destructive proportions hours before the rains had ceased, and, most unfortunately, over much of the area covered they occurred during the night.

The great floods occurred in the Hudson Valley of New York, virtually all of Vermont and New Hampshire,